Oliver Sølund Kirsebom

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Brief Bio

I hold a PhD in Nuclear Physics from Aarhus University, Denmark. For more than a decade I was a frequent visitor at particle accelerator laboratories such as CERN in Switzerland, studying the smallest building blocks of matter. Nowadays, however, my focus has shifted to a more applied realm. As the Lead Data Scientist at Open Ocean Robotics, I help making sense of a wide range of ocean sensor data collected by unmanned surface vessels, building data analysis pipelines, for example, automating the detection and classification of marine mammal vocalisations.

Employment

2024 - Present	Senior Data Scientist, Open Ocean Robotics
2022 - 2024	Lead Data Scientist, Open Ocean Robotics
2019 - Present	Adjunct Prof., Computer Science, Dalhousie University
2020 - 2022	Senior Staff Scientist, Dalhousie University
2018 - 2020	Lead Acoustic Data Analyst, Dalhousie University
2015 - 2018	Assistant Prof., Dept. of Physics and Astronomy, Aarhus University
2013 - 2015	Postdoc, Dept. of Physics and Astronomy, Aarhus University
2010 - 2013	Postdoc, TRIUMF, University of British Columbia

University Education

2006 - 2010	PhD Physics, Aarhus University
2005 - 2006	Fulbright student, University of Washington
2002 - 2005	BSc Physics and Mathemathics, Aarhus University

Research Grants

2022 - 2026	Canada Nature Fund for Aquatic Species at Risk, Building an 'intelligent' whale detection and movement forecast system., \in 1.0M (Co-P.I.)
2020 - 2022	Ocean and Freshwater Science Contribution Program, Building Neural Networks for Classification of Killer Whale Calls, $\leq 0.40 \mathrm{M}$ (Co-P.I.)
2015 - 2018	The Villum Foundation Young Investigator Programme, Nuclear Astrophysics at the Precision Frontier, $\in 0.41M$ (P.I.)

Fellowships, Scholarships, and Awards

2020 Mitacs Accelerate Fellowship, Identification of High-Frequency Periodic Acoustic Fish Tags With Deep learning, \in 32k

2020	Ocean Frontier Institute Visiting Fellowship, €4k
2019	NVIDIA Accelerated Data Science GPU Grant, $\in\!\!2k$
2010	The Villum Foundation Postdoc Fellowship, Experiments in Nuclear Astrophysics With Radioactive Beams at the ISAC-II Facility at TRIUMF, \$190k
2007	Foreign Graduate Student Invitation Program Grant, Tokyo Institute of Technology, Japan
2005	The Danish-American Fulbright Commission; Nordea Danmark-fonden; Faculty of Science, Aarhus University; Etatsråd CG Filtenborg og Hustru Marie Filtenborgs Studielegat; Observator mag.scient Julie Marie Vinter Hansens Rejselegat, €18k (combined)
2002	International Physics Olympiad Honorable Mention

Publications

Over 60 peer-reviewed research articles and conference proceedings plus a smaller number of feature articles and viewpoints; 1,047 citations and h-index of 18. (Google Scholar, 2022.02.05.) A selection of recent or noteworthy papers is provided below. For a complete list, see page 4 or go to oliskir.github.io.

B. Padovese, et al., Adapting deep learning models to new acoustic environments—A case study on the North Atlantic right whale upcall, Ecological Informatics 77, 102169.

S. Medisetty, et al., Identification of periodic fish tags with deep learning, The Journal of Ocean Technology 16, 134–149.

M. J. Rider, et al., Space use patterns of sharks in relation to boat activity in an urbanized coastal waterway, Marine Environmental Research 172, 105489.

O. S. Kirsebom, et al., Performance of a deep neural network at detecting North Atlantic right whale upcalls, The Journal of the Acoustical Society of America 147, 2636–2646.

O. S. Kirsebom, et al., Discovery of an Exceptionally Strong β -Decay Transition of ${}^{20}F$ and Implications for the Fate of Intermediate-Mass Stars, Physical Review Letters 123, 262701.

O. S. Kirsebom, et al., First Accurate Normalization of the β -delayed α Decay of ^{16}N and Implications for the $^{12}C(\alpha,\gamma)^{16}O$ Astrophysical Reaction Rate, Physical Review Letters 121, 142701.

O. S. Kirsebom, et al., Improved Limit on Direct α Decay of the Hoyle State, Physical Review Letters 108, 202501.

Talks

2021

2020

2019

2018

2012

Numerous (> 50) presentations at international conferences and workshops including several invited talks. For a complete list, see oliskir.github.io.

Software

2020 kadlu, Underwater sound propagation modelling, Python
2019 ketos, Deep learning audio analysis, Python
2018 simX, Nuclear physics monte carlo simulation, C++

2018 Open R-matrix, Nuclear physics modelling, C++

Teaching

2013 - 2017	Extracurricular	programme for	: 1st-year s	students, (Coordinator

2015 Nuclear astrophysics graduate course, Lecturer 2014 Electromagnetism laboratory course, Coordinator

2006 – 2010 Physics and mathematics undergraduate courses, Teaching Assistant

Student Supervision

2020 - 2021	Santosh Medisetty, MSc Computer Science, Dalhousie University (Cosupervisor)
2019 - 2020	Xuhui Liu, MSc Computer Science, Dalhousie University (Co-supervisor)
2016 - 2017	Helle Bisgaard Sørensen, MSc Physics, Aarhus University (Principal supervisor)
2014 - 2015	Sofie Tilbæk Nielsen, BSc Physics, Aarhus University (Principal supervisor)

Conference and Workshop Organization

21–22 Nov 2019 Organizer of the workshop *Detection and Classification in Marine Bioacoustics with Deep Learning* with 30 participants from Canada, the U.S. and Europe.

Academic Services

2022 - Present	Member of ONC's Ocean Observatory Council
2016 - 2018	Member of the Liaison Committee at the Department of Physics and Astron-

omy, Aarhus University

Refereeing

Physics Review Letters, Physical Review C, The Astrophysical Journal, Journal of the Acoustical Society of America, Hyperfine Interactions, Methods in Ecology and Evolution, PLOS One

Professional Memberships

2018 - 2020	Member of the Canadian Acoustical Association
2013 - 2018	Member of the Danish Physical Society

Languages

Danish (mother tongue), English (fluent), German (intermediate), Italian (intermediate)

Publications

Research Articles

- E. Jensen, S. Nielsen, A. Andreyev, M. Borge, J. Cederkll, L. Fraile, H. Fynbo, L. Harkness-Brennan, B. Jonson, D. Judson, O. Kirsebom, R. Lic, M. Lund, M. Madurga, N. Marginean, C. Mihai, R. Page, A. Perea, K. Riisager, and O. Tengblad. *Detailed study of the decay of*²¹Mg. The European Physical Journal A **60**, 153 (2024), URL http://dx.doi.org/https://doi.org/10.1140/epja/s10050-024-01376-6
- B. Padovese, O. S. Kirsebom, F. Frazao, C. H. Evers, W. A. Beslin, J. Theriault, and S. Matwin. Adapting deep learning models to new acoustic environments - A case study on the North Atlantic right whale upcall. Ecological Informatics 77, 102169. ISSN 1574-9541 (2023), URL http://dx.doi.org/https://doi.org/10.1016/j.ecoinf.2023.102169
- L. Sun, C. Fry, B. Davids, N. Esker, C. Wrede, M. Alcorta, S. Bhattacharjee, M. Bowry, B. A. Brown, T. Budner, R. Caballero-Folch, L. Evitts, M. Friedman, A. Garnsworthy, B. Glassman, G. Hackman, J. Henderson, O. S. Kirsebom, J. Lighthall, P. Machule, J. Measures, M. Moukaddam, J. Park, C. Pearson, D. Prez-Loureiro, C. Ruiz, P. Ruotsalainen, J. Small-combe, J. K. Smith, D. Southall, J. Surbrook, L. E. Weghorn, and M. Williams. First application of Markov chain Monte Carlo-based Bayesian data analysis to the Doppler-shift attenuation method. Physics Letters B 839, 137801. ISSN 0370-2693 (2023), URL http://dx.doi.org/https://doi.org/10.1016/j.physletb.2023.137801
- M. Kuhlwein, K. Lytje, H. O. U. Fynbo, A. Gad, E. Jensen, O. S. Kirsebom, M. Munch, J. Refsgaard, and K. Riisager. Exclusive decay study of the 16.62 MeV (2⁻, T = 1) resonance in ¹²C. Physics Letters B **825**, 136857. ISSN 0370-2693 (2022), URL http://dx.doi.org/https://doi.org/10.1016/j.physletb.2021.136857
- S. Medisetty, D. Ouellette, F. Smith, M. Richard, S. Johnston, J. Quirion, J. Newport, C. Whidden, and O. Kirsebom. *Identification of periodic fish tags with deep learning*. The Journal of Ocean Technology **16**, 134–149 (2021)
- M. J. Rider, O. S. Kirsebom, A. J. Gallagher, E. Staaterman, J. S. Ault, C. R. Sasso, T. Jackson, J. A. Browder, and N. Hammerschlag. *Space use patterns of sharks in relation to boat activity in an urbanized coastal waterway*. Marine Environmental Research page 105489. ISSN 0141-1136 (2021), URL http://dx.doi.org/https://doi.org/10.1016/j.marenvres.2021.105489
- N. J. Hubbard, C. A. Diget, S. P. Fox, H. O. U. Fynbo, A. M. Howard, O. S. Kirsebom, A. M. Laird, M. Munch, A. Parikh, M. Pignatari, and J. R. Tomlinson. New Experimental 23Na(, p)26Mg Reaction Rate for Massive Star and Type Ia Supernova Models. The Astrophysical Journal 912, 59 (2021), URL http://dx.doi.org/10.3847/1538-4357/abee91
- B. Padovese, F. Frazao, O. S. Kirsebom, and S. Matwin. *Data augmentation for the classification of North Atlantic right whales upcalls*. The Journal of the Acoustical Society of America **149**, 2520–2530 (2021), URL http://dx.doi.org/10.1121/10.0004258
- O. S. Kirsebom, A. M. Howard, M. Munch, S. Sablok, J. A. Swartz, and H. O. U. Fynbo. Experimental study of the $^{11}B(p,3\alpha)\gamma$ reaction at $E_p=0.5$ –2.7 MeV. The European Physical Journal A **56**, 179 (2020), URL http://dx.doi.org/10.1140/epja/s10050-020-00183-z
- O. S. Kirsebom, F. Frazao, Y. Simard, N. Roy, S. Matwin, and S. Giard. *Performance of a deep neural network at detecting North Atlantic right whale upcalls*. The Journal of the Acoustical Society of America 147, 2636–2646 (2020), URL http://dx.doi.org/10.1121/10.0001132

- M. Munch, O. S. Kirsebom, J. A. Swartz, and H. O. U. Fynbo. Resolving the $^{11}B(p,\alpha_0)$ cross-section discrepancies between 0.5 and 3.5 MeV. The European Physical Journal A **56**, 17 (2020), URL http://dx.doi.org/10.1140/epja/s10050-019-00016-8
- O. S. Kirsebom, S. Jones, D. F. Strömberg, G. Martínez-Pinedo, K. Langanke, F. K. Röpke, B. A. Brown, T. Eronen, H. O. U. Fynbo, M. Hukkanen, A. Idini, A. Jokinen, A. Kankainen, J. Kostensalo, I. Moore, H. Möller, S. T. Ohlmann, H. Penttilä, K. Riisager, S. Rinta-Antila, P. C. Srivastava, J. Suhonen, W. H. Trzaska, and J. Äystö. Discovery of an Exceptionally Strong β-Decay Transition of ²⁰F and Implications for the Fate of Intermediate-Mass Stars. Phys. Rev. Lett. 123, 262701 (2019), URL http://dx.doi.org/10.1103/PhysRevLett. 123.262701
- O. S. Kirsebom, M. Hukkanen, A. Kankainen, W. H. Trzaska, D. F. Strömberg, G. Martínez-Pinedo, K. Andersen, E. Bodewits, B. A. Brown, L. Canete, J. Cederkäll, T. Enqvist, T. Eronen, H. O. U. Fynbo, S. Geldhof, R. de Groote, D. G. Jenkins, A. Jokinen, P. Joshi, A. Khanam, J. Kostensalo, P. Kuusiniemi, K. Langanke, I. Moore, M. Munch, D. A. Nesterenko, J. D. Ovejas, H. Penttilä, I. Pohjalainen, M. Reponen, S. Rinta-Antila, K. Riisager, A. de Roubin, P. Schotanus, P. C. Srivastava, J. Suhonen, J. A. Swartz, O. Tengblad, M. Vilen, S. Vínals, and J. Äystö. *Measurement of the* 2⁺ → 0⁺ ground-state transition in the β decay of ²⁰F. Phys. Rev. C 100, 065805 (2019), URL http://dx.doi.org/10.1103/PhysRevC.100.065805
- B. Davids, M. Williams, N. E. Esker, M. Alcorta, D. Connolly, B. R. Fulton, K. Hudson, N. Khan, O. S. Kirsebom, J. Lighthall, and P. Machule. *Initial operation of the recoil mass spectrometer EMMA at the ISAC-II facility of TRIUMF*. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 930, 191–195 (2019), URL http://dx.doi.org/https://doi.org/10.1016/j.nima.2019.03.070
- O. S. Kirsebom, O. Tengblad, R. Lica, M. Munch, K. Riisager, H. O. U. Fynbo, M. J. G. Borge, M. Madurga, I. Marroquin, A. N. Andreyev, T. A. Berry, E. R. Christensen, P. D. Fernández, D. T. Doherty, P. Van Duppen, L. M. Fraile, M. C. Gallardo, P. T. Greenlees, L. J. Harkness-Brennan, N. Hubbard, M. Huyse, J. H. Jensen, H. Johansson, B. Jonson, D. S. Judson, J. Konki, I. Lazarus, M. V. Lund, N. Marginean, R. Marginean, A. Perea, C. Mihai, A. Negret, R. D. Page, V. Pucknell, P. Rahkila, O. Sorlin, C. Sotty, J. A. Swartz, H. B. Sørensen, H. Törnqvist, V. Vedia, N. Warr, and H. De Witte. First Accurate Normalization of the β-delayed α Decay of ¹⁶N and Implications for the ¹²C(α, γ) ¹⁶O Astrophysical Reaction Rate. Physical Review Letters 121, 142701 (2018), URL http://dx.doi.org/10.1103/PhysRevLett.121.142701
- M. Dahl, A. Brun, O. S. Kirsebom, and G. Andresen. *Improving Short-Term Heat Load Forecasts with Calendar and Holiday Data*. Energies 11, 1678 (2018), URL http://dx.doi.org/10.3390/en11071678
- M. Munch, O. S. Kirsebom, J. A. Swartz, K. Riisager, and H. O. U. Fynbo. Measurement of the full excitation spectrum of the ⁷Li(p, γ)αα reaction at 441 keV. Physics Letters B 782, 779–784 (2018), URL http://dx.doi.org/10.1016/j.physletb.2018.06.013
- J. Refsgaard, H. O. U. Fynbo, O. S. Kirsebom, and K. Riisager. Three-body effects in the Hoyle-state decay. Physics Letters B 779, 414–419 (2018), URL http://dx.doi.org/10.1016/j.physletb.2018.02.031
- V. Pesudo, M. J. G. Borge, A. M. Moro, J. A. Lay, E. Nácher, J. Gómez-Camacho, O. Tengblad, L. Acosta, M. Alcorta, M. A. G. Alvarez, C. Andreoiu, P. C. Bender, R. Braid, M. Cubero,

- A. D. Pietro, J. P. Fernández-García, P. Figuera, M. Fisichella, B. R. Fulton, A. B. Garnsworthy, G. Hackman, U. Hager, O. S. Kirsebom, K. Kuhn, M. Lattuada, G. Marquínez-Durán, I. Martel, D. Miller, M. Moukaddam, P. D. O'Malley, A. Perea, M. M. Rajabali, A. M. Sánchez-Benítez, F. Sarazin, V. Scuderi, C. E. Svensson, C. Unsworth, and Z. M. Wang. Scattering of the Halo Nucleus ¹¹Be on ¹⁹⁷Au at Energies around the Coulomb Barrier. Physical Review Letters **118**, 152502 (2017), URL http://dx.doi.org/10.1103/physrevlett. 118.152502
- M. V. Lund, A. Andreyev, M. J. G. Borge, J. Cederkll, H. D. Witte, L. M. Fraile, H. O. U. Fynbo, P. T. Greenlees, L. J. Harkness-Brennan, A. M. Howard, M. Huyse, B. Jonson, D. S. Judson, O. S. Kirsebom, J. Konki, J. Kurcewicz, I. Lazarus, R. Lica, S. Lindberg, M. Madurga, N. Marginean, R. Marginean, I. Marroquin, C. Mihai, M. Munch, E. Nacher, A. Negret, T. Nilsson, R. D. Page, S. Pascu, A. Perea, V. Pucknell, P. Rahkila, E. Rapisarda, K. Riisager, F. Rotaru, C. Sotty, M. Stanoiu, O. Tengblad, A. Turturica, P. V. Duppen, V. Vedia, R. Wadsworth, and N. Warr. Beta-delayed proton emission from ²⁰Mg. The European Physical Journal A 52, 304 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16304-x
- K. L. Laursen, H. O. U. Fynbo, O. S. Kirsebom, K. S. Madsbøll, and K. Riisager. Complete kinematical study of the 3α breakup of the 16.11 MeV state in ¹²C. The European Physical Journal A 52, 271 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16271-2
- M. Munch, M. Alcorta, H. O. U. Fynbo, M. Albers, S. Almaraz-Calderon, M. L. Avila, A. D. Ayangeakaa, B. B. Back, P. F. Bertone, P. F. F. Carnelli, M. P. Carpenter, C. J. Chiara, J. A. Clark, B. DiGiovine, J. P. Greene, J. L. Harker, C. R. Hoffman, N. J. Hubbard, C. L. Jiang, O. S. Kirsebom, T. Lauritsen, K. L. Laursen, S. T. Marley, C. Nair, O. Nusair, D. Santiago-Gonzalez, J. Sethi, D. Seweryniak, R. Talwar, C. Ugalde, and S. Zhu. Independent measurement of the Hoyle state β feeding from ¹²B using Gammasphere. Physical Review C 93, 065803 (2016), URL http://dx.doi.org/10.1103/physrevc.93.065803
- O. S. Kirsebom, P. Bender, A. Cheeseman, G. Christian, R. Churchman, D. S. Cross, B. Davids, L. J. Evitts, J. Fallis, N. Galinski, A. B. Garnsworthy, G. Hackman, J. Lighthall, S. Ketelhut, P. Machule, D. Miller, S. T. Nielsen, C. R. Nobs, C. J. Pearson, M. M. Rajabali, A. J. Radich, A. Rojas, C. Ruiz, A. Sanetullaev, C. D. Unsworth, and C. Wrede. *Measurement of lifetimes in* ²³Mg. Physical Review C 93, 025802 (2016), URL http://dx.doi.org/10.1103/physrevc.93.025802
- J. Refsgaard, O. Kirsebom, E. Dijck, H. Fynbo, M. Lund, M. Portela, R. Raabe, G. Randisi, F. Renzi, S. Sambi, A. Sytema, L. Willmann, and H. Wilschut. *Measurement of the branching ratio for β-delayed α decay of ¹⁶N*. Physics Letters B **752**, 296–301 (2016), URL http://dx.doi.org/10.1016/j.physletb.2015.11.047
- K. L. Laursen, H. O. U. Fynbo, O. S. Kirsebom, K. S. Madsbøll, and K. Riisager. *Unbound states in* ^{12}C populated by γ -decay of the $(J^{\pi}, T) = (2^+, 1)$ 16.11 MeV state. The European Physical Journal A **52**, 370 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16370-0
- V. Margerin, G. Lotay, P. J. Woods, M. Aliotta, G. Christian, B. Davids, T. Davinson, D. T. Doherty, J. Fallis, D. Howell, O. S. Kirsebom, D. J. Mountford, A. Rojas, C. Ruiz, and J. A. Tostevin. Inverse Kinematic Study of the ^{26g}Al(d, p)Al²⁷ Reaction and Implications for Destruction of ²⁶Al in Wolf-Rayet and Asymptotic Giant Branch Stars. Physical Review Letters 115, 062701 (2015), URL http://dx.doi.org/10.1103/physrevlett.115.062701
- A. M. Howard, M. Munch, H. O. U. Fynbo, O. S. Kirsebom, K. L. Laursen, C. A. Diget, and N. J. Hubbard. ²³Na(α, p)²⁶Mg Reaction Rate at Astrophysically Relevant Energies. Physical Review Letters 115, 052701 (2015), URL http://dx.doi.org/10.1103/physrevlett.115. 052701

- O. S. Kirsebom, H. O. U. Fynbo, K. Riisager, R. Raabe, and T. Roger. Analysis of the response of silicon detectors to α particles and ¹⁶O ions. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 758, 57–61 (2014), URL http://dx.doi.org/10.1016/j.nima.2014.05.005
- K. L. Laursen, O. S. Kirsebom, H. O. U. Fynbo, A. Jokinen, M. Madurga, K. Riisager, A. Saastamoinen, O. Tengblad, and J. Äystö. High-statistics measurement of the β-delayed α spectrum of ²⁰Na. The European Physical Journal A 49, 79 (2013), URL http://dx.doi.org/10.1140/epja/i2013-13079-6
- M. J. G. Borge, L. M. Fraile, H. O. U. Fynbo, B. Jonson, O. S. Kirsebom, T. Nilsson, G. Nyman, G. Possnert, K. Riisager, and O. Tengblad. Rare βp decays in light nuclei. Journal of Physics G: Nuclear and Particle Physics 40, 035109 (2013), URL http://dx.doi.org/10.1088/0954-3899/40/3/035109
- O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, H. O. U. Fynbo, M. Madurga, and O. Tengblad. Observation of α decay from a state in ¹⁰B at 11.48 MeV. Physical Review C 85, 054308 (2012), URL http://dx.doi.org/10.1103/physrevc.85.054308
- O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, B. Jonson, M. Madurga, T. Nilsson, G. Nyman, K. Riisager, O. Tengblad, and M. Turrión. *Improved Limit on Direct α Decay of the Hoyle State*. Physical Review Letters 108, 202501 (2012), URL http://dx.doi.org/10.1103/physrevlett.108. 202501
- T. Roger, J. Büscher, B. Bastin, O. S. Kirsebom, R. Raabe, M. Alcorta, J. Äystö, M. J. G. Borge, M. Carmona-Gallardo, T. E. Cocolios, J. Cruz, P. Dendooven, L. M. Fraile, H. O. U. Fynbo, D. Galaviz, L. R. Gasques, G. S. Giri, M. Huyse, S. Hyldegaard, K. Jungmann, W. L. Kruithof, M. Lantz, A. Perea, K. Riisager, A. Saastamoinen, B. Santra, P. D. Shidling, M. Sohani, A. J. Sørensen, O. Tengblad, E. Traykov, D. J. van der Hoek, P. V. Duppen, O. O. Versolato, and H. W. Wilschut. Precise Determination of the Unperturbed ⁸B Neutrino Spectrum. Physical Review Letters 108, 162502 (2012), URL http://dx.doi.org/10.1103/physrevlett.108.162502
- M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Domínguez-Reyes, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, S. Hyldegaard, H. Jeppesen, B. Jonson, O. S. Kirsebom, M. Madurga, A. Maira, A. Muñoz-Martín, T. Nilsson, G. Nyman, D. Obradors, A. Perea, K. Riisager, O. Tengblad, and M. Turrion. Properties of 12C resonances determined from the ¹⁰B(³He, pααα) and ¹¹B(³He, dααα) reactions studied in complete kinematics. Physical Review C 86, 064306 (2012), URL http://dx.doi.org/10.1103/physrevc.86.064306
- O. S. Kirsebom and B. Davids. One fewer solution to the cosmological lithium problem. Physical Review C 84, 058801 (2011), URL http://dx.doi.org/10.1103/physrevc.84.058801
- O. S. Kirsebom, H. O. U. Fynbo, A. Jokinen, M. Madurga, K. Riisager, A. Saastamoinen, O. Tengblad, and J. Äystö. New β-delayed proton lines from ²³Al. The European Physical Journal A 47, 130 (2011), URL http://dx.doi.org/10.1140/epja/i2011-11130-4
- O. S. Kirsebom, S. Hyldegaard, M. Alcorta, M. J. G. Borge, J. Büscher, T. Eronen, S. Fox, B. R. Fulton, H. O. U. Fynbo, H. Hultgren, A. Jokinen, B. Jonson, A. Kankainen, P. Karvonen, T. Kessler, A. Laird, M. Madurga, I. Moore, G. Nyman, H. Penttilä, S. Rahaman, M. Reponen, K. Riisager, T. Roger, J. Ronkainen, A. Saastamoinen, O. Tengblad, and J. Ästö. Precise and accurate determination of ⁸B decay spectrum. Physical Review C 83, 065802 (2011), URL http://dx.doi.org/10.1103/physrevc.83.065802
- E. Tengborn, A. M. Moro, T. Nilsson, M. Alcorta, M. J. G. Borge, J. Cederkäll, C. Diget, L. M. Fraile, H. O. U. Fynbo, J. Gomez-Camacho, H. B. Jeppesen, H. T. Johansson, B. Jonson, O. S. Kirsebom, H. H. Knudsen, M. Madurga, G. Nyman, A. Richter, K. Riisager,

- G. Schrieder, O. Tengblad, N. Timofeyuk, M. Turrion, D. Voulot, and F. Wenander. The $^8Li+^2H$ reaction studied in inverse kinematics at 3.15 MeV/nucleon using the REX-ISOLDE post-accelerator. Physical Review C 84, 064616 (2011), URL http://dx.doi.org/10.1103/physrevc.84.064616
- O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Dominguez-Reyes, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, S. Hyldegaard, B. Jonson, M. Madurga, A. M. Martin, T. Nilsson, G. Nyman, A. Perea, K. Riisager, and O. Tengblad. *Breakup of ¹²C resonances into three α particles*. Physical Review C 81, 064313 (2010), URL http://dx.doi.org/10.1103/physrevc.81.064313
- S. Hyldegaard, M. Alcorta, B. Bastin, M. J. G. Borge, R. Boutami, S. Brandenburg, J. Büscher, P. Dendooven, C. A. Diget, P. V. Duppen, T. Eronen, S. P. Fox, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, J. Huikari, M. Huyse, H. B. Jeppesen, A. S. Jokinen, B. Jonson, K. Jungmann, A. Kankainen, O. S. Kirsebom, M. Madurga, I. Moore, A. Nieminen, T. Nilsson, G. Nyman, G. J. G. Onderwater, H. Penttil, K. Perjrvi, R. Raabe, K. Riisager, S. Rinta-Antila, A. Rogachevskiy, A. Saastamoinen, M. Sohani, O. Tengblad, E. Traykov, Y. Wang, K. Wilhelmsen, H. W. Wilschut, and J. Äystö. *R-matrix analysis of the β decays of* ¹²N and ¹²B. Physical Review C 81, 024303 (2010), URL http://dx.doi.org/10.1103/physrevc. 81.024303
- O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Dominguez-Reyes, L. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, G. Garcia, S. Hyldegaard, H. Jeppesen, B. Jonson, P. Joshi, M. Madurga, A. Maira, A. Muñoz, T. Nilsson, G. Nyman, D. Obradors, A. Perea, K. Riisager, O. Tengblad, and M. Turrion. Observation of γ-delayed 3α breakup of the 15.11 and 12.71 MeV states in ¹²C. Physics Letters B 680, 44–49 (2009), URL http://dx.doi.org/10.1016/j.physletb.2009.08.034
- S. Hyldegaard, C. Forssén, C. Diget, M. Alcorta, F. Barker, B. Bastin, M. Borge, R. Boutami, S. Brandenburg, J. Bscher, P. Dendooven, P. V. Duppen, T. Eronen, S. Fox, B. Fulton, H. Fynbo, J. Huikari, M. Huyse, H. Jeppesen, A. Jokinen, B. Jonson, K. Jungmann, A. Kankainen, O. Kirsebom, M. Madurga, I. Moore, P. Navrátil, T. Nilsson, G. Nyman, G. Onderwater, H. Penttil, K. Perjrvi, R. Raabe, K. Riisager, S. Rinta-Antila, A. Rogachevskiy, A. Saastamoinen, M. Sohani, O. Tengblad, E. Traykov, J. Vary, Y. Wang, K. Wilhelmsen, H. Wilschut, and J. Äystö. Precise branching ratios to unbound ¹²C states from ¹²N and ¹²B β-decays. Physics Letters B 678, 459–464 (2009), URL http://dx.doi.org/10.1016/j.physletb. 2009.06.064
- M. Alcorta, O. S. Kirsebom, M. Borge, H. Fynbo, K. Riisager, and O. Tengblad. A complete kinematics approach to study multi-particle final state reactions. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 605, 318–325 (2009), URL http://dx.doi.org/10.1016/j.nima.2009.03.246
- M. Madurga, M. Borge, M. Alcorta, L. Fraile, H. Fynbo, B. Jonson, O. S. Kirsebom, G. Martínez-Pinedo, T. Nilsson, G. Nyman, A. Perea, A. Poves, K. Riisager, O. Tengblad, E. Tengborn, and J. V. der Walle. *Evidence of a new state in ¹¹Be observed in the ¹¹Li beta-decay*. Physics Letters B **677**, 255–259 (2009), URL http://dx.doi.org/10.1016/j.physletb.2009.05.
- H. O. U. Fynbo, R. Álvarez-Rodríguez, A. S. Jensen, O. S. Kirsebom, D. V. Fedorov, and E. Garrido. Three-body decays and R-matrix analyses. Physical Review C 79, 054009 (2009), URL http://dx.doi.org/10.1103/physrevc.79.054009
- M. Madurga, M. J. G. Borge, M. Alcorta, L. M. Fraile, H. O. U. Fynbo, B. Jonson, O. S. Kirsebom, T. Nilsson, G. Nyman, A. Perea, K. Riisager, O. Tengblad, E. Tengborn, and J. V. der

- Walle. Kinematic identification of the βt branch in the decay of ¹¹Li. The European Physical Journal A **42**, 415 (2009), URL http://dx.doi.org/10.1140/epja/i2008-10769-0
- R. Álvarez-Rodríguez, A. S. Jensen, E. Garrido, D. V. Fedorov, H. O. U. Fynbo, and O. S. Kirsebom. *Three-Body Decays: Structure, Decay Mechanism and Fragment Properties.* Few-Body Systems **45**, 149–152 (2009), URL http://dx.doi.org/10.1007/s00601-009-0010-2

Feature Articles

- O. Kirsebom, S. Medisetty, C. Whidden, D. Ouellette, F. Smith, J. Quirion, and S. Johnston. Advancing Acoustic Fish Tracking with Deep Learning. The Journal of Ocean Technology 16, 124–125 (2021)
- F. Frazao, O. Kirsebom, B. Padovese, and S. Matwin. *Embedded Deep Learning for Underwater Acoustics*. The Journal of Ocean Technology **15**, 174–175 (2020)
- O. Kirsebom. At eksplodere eller at implodere? Aktuel Naturvidenskab 4-2020, 21-25 (2020)
- O. Kirsebom, F. Frazao, I. Hessler, and S. Matwin. Towards Versatile and Adaptive Detection Algorithms in Underwater Acoustics. The Journal of Ocean Technology 14, 144–145 (2019)
- O. S. Kirsebom. Watching the Hoyle State Fall Apart. Physics 10, 103 (2017), URL http://dx.doi.org/10.1103/physics.10.103
- D. Jenkins and O. S. Kirsebom. *The secret of life*. Physics World **26**, 23–26 (2013), URL http://dx.doi.org/10.1088/2058-7058/26/02/32

Conference Proceedings

- D. Nguyen, O. S. Kirsebom, F. Frazo, R. Fablet, and S. Matwin. Recurrent Neural Networks with Stochastic Layers for Acoustic Novelty Detection. In ICASSP 2019 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pages 765–769. ISSN 2379-190X (2019), URL http://dx.doi.org/10.1109/ICASSP.2019.8682901
- J. A. Swartz, H. O. U. Fynbo, K. L. Andersen, M. Munch, and O. S. Kirsebom. *Investigating* ^{16}O via the $^{15}N(p,\alpha)^{12}C$ reaction. AIP Conference Proceedings **2038**, 020014 (2018), URL http://dx.doi.org/10.1063/1.5078833
- R. Garg, C. Barton, C. A. Diget, S. Courtin, G. Fruet, H. O. U. Fynbo, A. Howard, A. Illana, D. G. Jenkins, I. Marroquin, O. S. Kirsebom, M. V. Lund, I. Moore, A. Perea, J. Refsgaard, J. E. Riley, S. Rinta-Antila, L. Sinclair, and O. T. and. *Rotational excitation of the Hoyle state in ¹²C.* Journal of Physics: Conference Series **940**, 012043 (2018), URL http://dx.doi.org/10.1088/1742-6596/940/1/012043
- O. S. Kirsebom. Experimental progress in clarifying the excitation spectrum of ¹²C. Journal of Physics: Conference Series 863, 012018 (2017), URL http://dx.doi.org/10.1088/1742-6596/863/1/012018
- M. J. G. Borge, V. Pesudo, E. Nácher, O. Tengblad., M. Cubero., A. Perea, A. M. Moro, J. A. Lay, J. Gómez-Camacho., M. A. G. Alvarez, J. P. Fernandez-Garcia, A. D. Prieto, P. Figuera, M. Fisichella., M. Lattuada., V. Scuderi, G. Marquínez-Durán, I. Martel., A. M. Sánchez-Benítez, M. Alcorta., P. C. Bender, R. Braid., A. B. Garnsworthy, G. Hackman., D. Miller., M. Moukaddam., M. Rajabali., C. Unsworth., Z. Wang, B. R. Fulton, U. Hager, O. Kirsebom, K. Kuhn., P. O'Malley., F. Sarazin, and C. Svensson. Scattering Of The Halo Nucleus ¹¹Be On A ¹⁹⁷Au Target At Energies Around The Coulomb Barrier. In Proceedings of The 26th International Nuclear Physics Conference PoS(INPC2016). Sissa Medialab (2017), URL http://dx.doi.org/10.22323/1.281.0207

- S. Courtin, G. Fruet, D. G. Jenkins, M. Heine, D. Montanari, L. G. Morris, G. Lotay, P. H. Regan, O. S. Kirsebom, S. D. Negra, F. Hammache, N. de Sereville, B. Bastin, F. de Oliveira, G. Randisi, C. Stodel, C. Beck, and F. Haas. Fusion Cross Sections of Astrophysics Interest Within the STELLA Project. In Proceedings of the 14th International Symposium on Nuclei in the Cosmos (NIC2016). Journal of the Physical Society of Japan (2017), URL http://dx.doi.org/10.7566/jpscp.14.021001
- O. S. Kirsebom, I. M. Alonso, T. Berry, M. J. G. Borge, E. R. Christensen, D. Doherty, P. D. Fernández, M. M. Flores, H. O. U. Fynbo, M. C. Gallardo, N. Hubbard, J. H. Jensen, H. Johansson, B. Jonson, R. Lica, M. V. Lund, A. P. Martínez, M. K. Munch, K. Riisager, O. Sorlin, J. A. Swartz, O. Tengblad, and V. Vedia. *Improved experimental determination of the branching ratio for β-delayed α decay of ¹⁶N.* EPJ Web of Conferences **165**, 01031 (2017), URL http://dx.doi.org/10.1051/epjconf/201716501031
- O. S. Kirsebom, J. Cederkäll, D. G. Jenkins, P. Joshi, R. Julin, A. Kankainen, T. Kibédi, O. Tengblad, and W. H. Trzaska. Towards an Experimental Determination of the Transition Strength Between the Ground States of ²⁰F and ²⁰Ne. In Proceedings of the 14th International Symposium on Nuclei in the Cosmos (NIC2016). Journal of the Physical Society of Japan (2017), URL http://dx.doi.org/10.7566/jpscp.14.021008
- S. Courtin, C. Jiang, G. Fruet, M. Heine, D. Jenkins, P. Adsley, L. Morris, P. Regan, M. Rudigier, D. Montanari, S. D. Negra, N. de Séréville, F. Haas, F. Hammache, O. Kirsebom, J. Lesrel, A. Meyer, D. Montanari, K. Auranen, M. Avila, A. Ayangeakaa, B. Back, S. Bottoni, M. Carpenter, C. Dickerson, B. DiGiovine, J. Greene, D. Henderson, C. Hoffman, R. Janssens, B. Kay, S. Kuvin, T. Lauritsen, R. Pardo, K. Rehm, D. Santiago-Gonzalez, J. Sethi, D. Seweryniak, R. Talwar, C. Ugalde, S. Zhu, C. Deibel, S. Marley, D. Bourgin, C. Stodel, A. Lefebvre-Schuhl, S. Almaraz-Calderon, X. Fang, X. Tang, M. Alcorta, B. Bucher, M. Albers, and P. Bertone. Cross section measurements in the ¹²C + ¹²C system. EPJ Web of Conferences 165, 01015 (2017), URL http://dx.doi.org/10.1051/epjconf/201716501015
- G. Fruet, S. Courtin, D. G. Jenkins, M. Heine, D. Montanari, L. G. Morris, P. Adsley, C. Beck, S. D. Negra, F. Haas, F. Hammache, O. S. Kirsebom, A. Meyer, P. H. Regan, M. Rudiger, N. de Séréville, and C. Stodel. Fusion cross section measurements of astrophysical interest for light heavy ions systems within the STELLA project. EPJ Web of Conferences 163, 00018 (2017), URL http://dx.doi.org/10.1051/epjconf/201716300018
- V. Pesudo, M. J. G. Borge, A. M. Moro, J. A. Lay, E. Nácher, J. Gómez-Camacho, O. Tengblad, L. Acosta, M. Alcorta, M. Alvarez, C. Andreoiu, P. Bender, R. Braid, M. Cubero, A. D. Pietro, J. P. Fernández-García, P. Figuera, M. Fisichella, B. R. Fulton, A. Garnsworthy, G. Hackman, U. Hager, O. S. Kirsebom, K. Kuhn, M. Lattuada, G. Marquínez-Durán, I. Martel, D. Miller, M. Moukaddam, P. D. O'Malley, A. Perea, M. M. Rajabali, A. M. Sánchez-Benítez, F. Sarazin, V. Scuderi, C. E. Svensson, C. Unsworth, and Z. M. Wang. Scattering of halo nuclei on heavy targets at energies around the Coulomb barrier: The case of ¹¹Be on ¹⁹⁷Au. EPJ Web of Conferences 163, 00045 (2017), URL http://dx.doi.org/10.1051/epjconf/201716300045
- M. Heine, S. Courtin, G. Fruet, D. Jenkins, D. Montanari, P. Adsley, C. Beck, S. D. Negra, P. Dené, F. Haas, F. Hammache, G. Heitz, O. Kirsebom, M. Krauth, J. Lesrel, A. Meyer, L. Morris, P. Regan, M. Richer, M. Rudigier, N. de Séréville, and C. Stodel. Sub-barrier fusion cross section measurements with STELLA. EPJ Web of Conferences 165, 01029 (2017), URL http://dx.doi.org/10.1051/epjconf/201716501029
- I. Marroquin, M. Borge, A. Ciemny, H. de Witte, L. Fraile, H. Fynbo, A. Garzón-Camacho,
 A. Howard, H. Johansson, B. Jonson, O. Kirsebom, G. Koldste, R. Lica, M. Lund, M. Madurga,
 C. Mazzocchi, C. Mihai, M. Munch, S. Nae, E. Nacher, A. Negret, T. Nilsson, A. Perea,
 J. Refsgaard, K. Riisager, E. Rapisarda, C. Sotty, M. Stanoiu, O. Tengblad, A. Turturica,

- and M. Vedia. *Multi-particle Emission from ³¹Ar at ISOLDE*. Acta Physica Polonica B **47**, 747 (2016), URL http://dx.doi.org/10.5506/aphyspolb.47.747
- O. S. Kirsebom, H. O. U. Fynbo, A. M. Howard, and K. L. Laursen. Applying new tools to old problems: experimental studies of resonances in ¹²C. Journal of Physics: Conference Series 569, 012013 (2014), URL http://dx.doi.org/10.1088/1742-6596/569/1/012013
- K. L. Laursen, H. O. U. Fynbo, A. M. Howard, and O. S. Kirsebom. Complete kinematics study of the $p + {}^{11}B \rightarrow {}^{12}C$ reaction. Journal of Physics: Conference Series **569**, 012073 (2014), URL http://dx.doi.org/10.1088/1742-6596/569/1/012073
- V. Pesudo, M. J. G. Borge, A. Moro, E. Nacher, L. Acosta, M. Alcorta, M. A. G. Alvarez, G. Ball, P. Bender, R. Braid, M. Cubero, A. di Pietro, J. Fernandez-Garcia, P. Figuera, M. Fisichella, B. R. Fulton, A. B. Garnsworthy, J. Gomez-Camacho, G. Hackman, O. S. Kirsebom, K. Kuhn, R. Krecken, M. Lattuada, J. Lay, G. Marquínez-Durán, I. Martel, D. Miller, M. Moukaddam, P. D. O'Malley, A. Perea, M. M. Rajabali, A. M. Sánchez-Benítez, F. Sarazin, V. Scuderi, C. E. Svensson, O. Tengblad, C. Unsworth, and Z. Wang. Reaction of the Halo Nucleus ¹¹Be on Heavy Targets at Energies Around the Coulomb Barrier. Acta Physica Polonica B 45, 375 (2014), URL http://dx.doi.org/10.5506/aphyspolb.45.375
- O. S. Kirsebom. ¹²C and the triple-α reaction rate. Journal of Physics: Conference Series **436**, 012072 (2013), URL http://dx.doi.org/10.1088/1742-6596/436/1/012072
- C. A. Diget, H. O. U. Fynbo, K. L. Laursen, K. O. Madsbøl, L. Jørgensen, O. S. Kirsebom, and K. Riisager. Complete kinematics measurement of the ¹¹B(p, γ)3α reaction. Journal of Physics: Conference Series 381, 012116 (2012), URL http://dx.doi.org/10.1088/1742-6596/381/1/012116
- O. S. Kirsebom. *Decay of* ¹²C* *into Three* α *Particles*. Few-Body Systems **54**, 755–759 (2012), URL http://dx.doi.org/10.1007/s00601-012-0441-z
- M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Dominguez-Reyes, L. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, S. Hyldegaard, H. B. Jeppesen, B. Jonson, O. S. Kirsebom, M. Madurga, A. Maira, A. Muñoz, T. Nilsson, G. Nyman, D. Obradors, A. Perea, K. Riisager, O. Tengblad, and M. Turrion. Properties of resonances in ¹²C above the triple-alpha threshold. Journal of Physics: Conference Series 312, 092013 (2011), URL http://dx.doi.org/10.1088/1742-6596/312/9/092013
- O. Kirsebom, H. O. Fynbo, H. H. Knudsen, K. Riisager, B. R. Fulton, A. Laird, S. P. Fox, M. J. G. Borge, M. Madurga, O. Tengblad, M. Alcorta, B. Jonson, G. Nyman, H. Hultgren, R. Raabe, J. Büscher, A. Saastamoinen, A. Jokinen, I. D. Moore, and J. Äystö. The ⁸B neutrino spectrum. In Proceedings of 11th Symposium on Nuclei in the Cosmos PoS(NIC XI). Sissa Medialab (2011), URL http://dx.doi.org/10.22323/1.100.0016
- M. Alcorta, M. J. G. Borge, M. Cubero, R. Dominguez-Reyes, L. Fraile, B. Fulton, H. O. U. Fynbo, D. Galaviz, S. Hyldegaard, H. Jeppesen, B. Jonson, O. Kirsebom, M. Madurga, A. Maira, A. Muñoz, T. Nilsson, G. Nyman, D. Obradors, A. Perea, K. Riisager, O. Tengblad, M. Turrioń, M. Milin, T. Niksic, S. Szilner, and D. Vretenar. Nuclear Structure of ¹²C from Break-up Studies in Complete Kinematics. In AIP Conference Proceedings. AIP (2009), URL http://dx.doi.org/10.1063/1.3232093
- H. O. U. Fynbo, C. A. Diget, S. Hyldegaard, H. B. Jeppesen, H. H. Knudsen, O. Kirsebom, K. Riisager, M. Alcorta, R. Boutami, M. J. G. Borge, M. Madurga, O. Tengblad, S. Brandenburg, P. Dendooven, K. Jungmann, G. J. G. Onderwater, A. Rogachevskly, M. Sohani, E. Traykov, H. W. Wilschut, J. Büscher, P. V. Duppen, M. Huyse, R. Raabe, T. Eronen, J. Huikary, A. Jokinen, A. Kankainen, K. Perajärvi, I. Moore, A. Nieminen,

H. Penttil, S. Rinta-Antila, A. Saastamoinen, Y. Wang, J. Äystö, B. Jonson, T. Nilsson, G. Nyman, K. Wilhelmsen, B. Fulton, S. Fox, and F. C. Barker. *The* β -decay approach for studying ¹²C. Journal of Physics: Conference Series **111**, 012003 (2008), URL http://dx.doi.org/10.1088/1742-6596/111/1/012003

Software

- O. S. Kirsebom and M. Smith. kadlu (2020), URL https://pypi.org/project/kadlu/
- F. Frazao and O. S. Kirsebom. ketos (2019), URL https://pypi.org/project/ketos/
- M. Munch, O. S. Kirsebom, and J. Refsgaard. *Open R-matrix* (2018), URL http://dx.doi.org/10.5281/zenodo.1174079
- M. Munch, J. H. Jensen, and O. S. Kirsebom. simX (2018), URL http://dx.doi.org/10.5281/zenodo.1320121